Claims

1. A light pipe for providing backlighting of a flat-panel display by means of at least one light source, wherein

- the light pipe is limited by a certain first surface

5 - said surface comprises patterns

- said patterns have diffractive properties for coupling the light out from the light pipe

- said patterns comprise uniform, mutually different areas with a certain distribution on said first surface.

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2. A light pipe according to Claim 1 wherein

- said patterns comprise parallel, straight or bowed, elongated surface formations, the height and width of which differ from the environment,

- said patterns comprise a certain first uniform area, in which a certain characteristic
15 parameter has a certain first value;

- said patterns comprise a certain second uniform area, in which said characteristic parameter has a certain second value, which differs from said first value;

and the surface formations in said first area differ from the surface formations in said second area with regard to said characteristic parameter, and said characteristic
20 parameter is at least one of the following: the orientation of the pattern, the distance between the pattern and the light source, the

- period length,

- fill factor,

- fill ratio,

25 - height,

- characteristic degree of modification

- angle of deflection

between the elongated surface formations of the pattern, which differ from the environment.

5   3.   A light pipe according to Claim 2, wherein the value of at least one characteristic parameter depends on the quantity, which has been defined in relation to the light source, such as the distance from the light source.

4.   A light pipe according to Claim 2, wherein the elongated patterns of the
10   surface formations change gradually from the first shapes of the first end of the pattern at the light source side to the other shapes of the opposite side of said pattern at the other end in a manner depending on a quantity, which is dependent on the light source, such as distance.

15   5.   A light pipe according to Claim 2, wherein the local plane in the area of the pattern, which plane is determined by the peaks of the surface formations of the patterns is in relation to a level determined by the first surface of the light pipe at an angle, which depends on a quantity, which is dependent on the light source, such as distance.

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6.   A light source according to Claim 2, wherein the fill ratio increases when moving from the end at the side of the light source to the opposite end of the light pipe.

25   7.   A light source according to Claim 1, wherein the distribution of the patterns depends on a quantity, which is dependent on the light source, such as distance.

8.   A light pipe according to Claim 1, wherein its first surface is on the side of the light pipe, which is closest to the display.

9. A light pipe according to Claim 1, wherein the elongated shapes of the surface formations in the patterns are repeated as similar in a certain uniform area of the surface of the light pipe.

10. A light source according to Claim 1, wherein the fill ratio increases along the central line of the light pipe from the end at the side of the light source to the opposite end of the light pipe, and the elongated formations, which differ from the environment, are perpendicular to the central line.

11. A light source according to Claim 1, wherein the fill ratio is between 0.2 and 0.5.

12. A light pipe according to Claim 1, wherein the fill ratio increases as measured along a straight line when moving away from the light source, and the elongated surface formations, which differ from the environment, are bowed as defined by conic section geometry, whereby the midpoint defined by the dimensions of the light source is located essentially at a focal point characterizing the bow.

13. A light pipe according to Claim 2, wherein the period length of its diffractive surface in a diffractive structure is between 1.5 and 3.5 μm.

14. A light pipe according to Claim 1, wherein the depth and/or height of the elongated surface formations of its diffractive surface in a diffractive structure is between 0.3 and 0.7 μm.

15. A light pipe according to Claim 1, wherein the light pipe has a polygonal shape, with at least one angle, which differs substantially from 90°.

16. A light pipe according to claim 1, wherein the light pipe has fluorescent and/or phosphorescent properties.

17. A light pipe arrangement comprising

5 - a light source

- a display,

-a light pipe and

-a base plate of the light pipe

wherein

10 - the light pipe is limited by a certain first surface

- said surface comprises patterns

- said patterns have diffractive properties for coupling the light out from the light pipe

- said patterns comprise uniform, mutually different areas with a certain distribution
15 on said first surface.

18. A light pipe arrangement according to Claim 17, wherein the number of light sources is three.